

I CLAIM

1. A seal for providing sealing between at least two separate and differing pressure zones and between a rotating structure and non-rotating structures, comprising first and second sealing means, the first sealing means comprising first and second seal lands positioned either side of a rotating seal member, said seal lands being connected together via connecting means, said connecting means being movably mounted on said non-rotating structure and arranged to be moveable so as to accommodate relative movement of said rotating and non-rotating structures, said second seal means being arranged and positioned to provide a seal between said non-rotating structure and the first seal land positioned in a lower pressure zone such that the pressure around this seal land is controlled.

2. A seal as claim in claim 1 wherein the two seal lands comprise two opposing magnets arranged to repel one another.

3. A seal as claimed in claim 2 wherein the magnetic sealing lands comprise rings.

4. A seal as claimed in claim 3 wherein the rings comprise segmented magnetic rings.

5. A seal as claimed in claim 4 wherein seals are provided between the segments of the magnetic rings.

6. A seal as claimed in claim 2 wherein said rotating seal member comprises a rotating sealing disc of a conducting material.

7. A seal as claimed in claim 6 wherein said rotating sealing disc is located in an intermediate pressure zone.

8. A seal as claimed in claim 1 wherein said first sealing means comprises an air riding seal.

9. A seal as claimed in claim 8 wherein said air riding seal comprises two rings arranged on opposite sides of the rotating seal member.

10. A seal as claimed in claim 9 wherein first biasing means is provided to bias the two rings apart and second biasing means to bias the two rings together.

11. A seal as claimed in claim 10 wherein the first and second biasing means comprise springs.

12. A seal as claimed in claim 1 wherein said first sealing means comprises a brush seal.

13. A seal as claimed in claim 12 wherein the brush seal comprises two brush seals arranged on opposite sides of the rotating seal member.

14. A seal as claimed in claim 1 wherein said first sealing means comprises a labyrinth seal.

15. A seal as claimed in claim 14 wherein the labyrinth seal comprises two labyrinth seals arranged on opposite sides of the rotating seal member.

16. A seal as claimed in claim 1 wherein the opposing faces of said seal lands each comprise a reduced area portion.

17. A seal as claimed in claim 16 wherein the reduced area portion of said seal lands are positioned directly opposite one another.

18. A seal as claimed in claims 16 wherein the second seal member is arranged and positioned such that the surface areas of the reduced area portions of the opposing faces of the seal land, are equal and the surface area of a portion of a face on the first seal land remote from the opposing faces of the seal lands is half of the surface area of the reduced area portion of the opposing face of the first seal land such that the forces on the seal lands are

substantially balanced.

19. A seal as claimed in claim 1 comprising a third seal sealing means, the third sealing means being arranged and positioned to provide a seal between the non rotating
5 structure and the connecting means, the connecting means between the second sealing means and the third sealing means being perforated such that the chamber partially defined by the second sealing means and third sealing means is interconnected with the chamber defined by the first and
10 second seal lands and the connecting means.

20. A seal as claimed in claim 1 wherein the rotating sealing member is shaped to increase the aerodynamic lift between the rotating sealing member and the first and second sealing lands.

15 21. A seal as claimed in claim 20 wherein the rotating sealing member has curved surface portions to direct fluid towards the first and second sealing lands.

22. A seal as claimed in claim 20 wherein the rotating sealing member has curved surface portions to direct fluid
20 towards the connecting means.

23. A seal as claimed in claim 1 wherein said connecting means, comprises a yoke.

24. A seal as claimed in claim 23 wherein the yoke is connected to the non-rotating member by one or more
25 springs.

25. A seal as claimed in claim 23 wherein said yoke is connected to said non- rotating member by a pivot point which allows rotational movement of said yoke.

26. A seal as claimed in claim 1 wherein said rotating
30 sealing member comprises a rotating sealing fin attached to a rotor of a gas turbine engine and said non rotating structure comprises an adjacent static structure of the gas

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turbine engine.

27. A seal as claimed in claim 26 wherein the rotor is a compressor rotor.

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